

ABSTRACT

Lower alkenes of from 2 to 5 carbon atoms, such as propene, are produced by the vapor phase catalytic oxidative dehydrogenation of lower alkane, such as propane, using a mixed metal oxide catalyst of formula (1) as described, containing manganese and at least one additional metal as essential elements, e.g., $\text{Mn}_1\text{Sb}_{0.15}\text{O}_x$, $\text{Mn}_1\text{P}_{0.2}\text{O}_x$, $\text{Mn}_1\text{S}_{0.15}\text{W}_{0.05}\text{Cr}_{0.1}\text{O}_x$. The lower alkene may be further oxidatively dehydrogenated using a mixed metal oxide catalyst of formula (1), especially formula (2), as described, to produce a mixture of unsaturated aldehyde and unsaturated acid. The unsaturated aldehyde may be further oxidatively dehydrogenated in the vapor phase in the presence of mixed metal oxide catalyst of formula (1), especially formula (3).